Solve the following systems using any method you choose:

$\left(\frac{37}{17}, \frac{-2}{17}\right)$

1) $\begin{cases} 2x+3y=4 \\ 3x-4y=7 \end{cases}$

4 and 3

$8x+12y=16$

$9x-12y=21$

$17x=37$

$\frac{17x}{17}=\frac{37}{17}$

$x=\frac{37}{17}$

$2\left(\frac{37}{17}\right)+3y=4$

$17\left(\frac{74}{17}+3y=4\right)$

$74+51y=68$

$-74 \quad -74$

$\frac{51y}{51}=\frac{-6}{51}$

$y=\frac{-2}{17}$

Solve the following systems using any method you choose:

$(-6, -6)$

2) $\begin{cases} x+y=-12 \\ 2x-3y=6 \end{cases}$; $y=-x-12$

$2x-3(-x-12)=6$

$2x+3x+36=6$

$5x+36=6$

$5x=-30$

$x=-6$

$-6+y=-12$

$+6 \quad +6$

$y=-6$

Solve the following systems using any method you choose:

3) $\begin{cases} 5x-2y=3 \\ 2x-y=0 \end{cases}$

Solve the following systems using any method you choose:

4) $\begin{cases} 5x - 7y = 2 \\ 3x = 4y \end{cases}$

$3x = 4y$

$-4y \quad -4y$

$3x - 4y = 0$

$(-8, -6)$

$3(5x - 7y = 2)$

$-5(3x - 4y = 0)$

$15x - 21y = 6$

$-15x + 20y = 0$

$-1y = 6$

$\frac{-1y}{-1} = \frac{6}{-1}$

$y = -6$

$3x = 4(-6)$

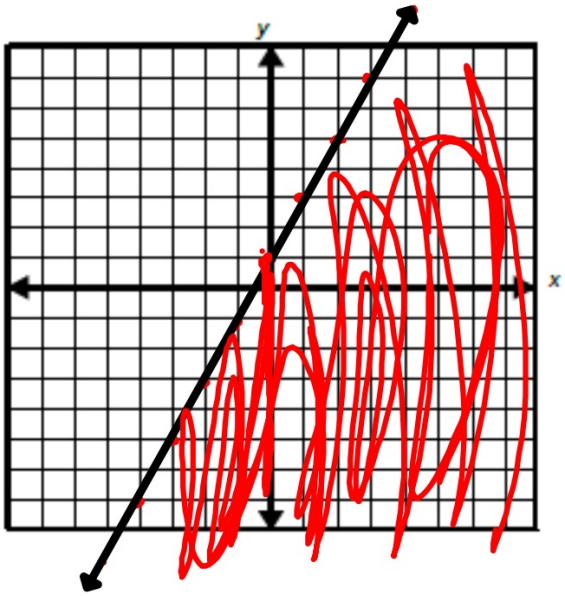
$3x = -24$

$x = -8$

Graph the following inequalities:

$y = mx + b$

5) $y - 2x \leq 1$



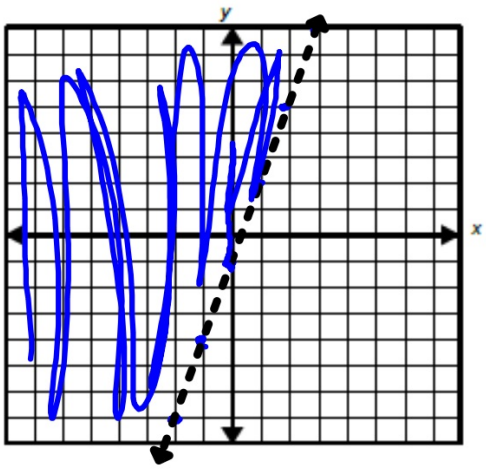
$y - 2x \leq 1$

$+2x \quad +2x$

$y \leq 2x + 1$

Graph the following inequalities:

6) $-2y+6x<2$



$-2y+6x<2$

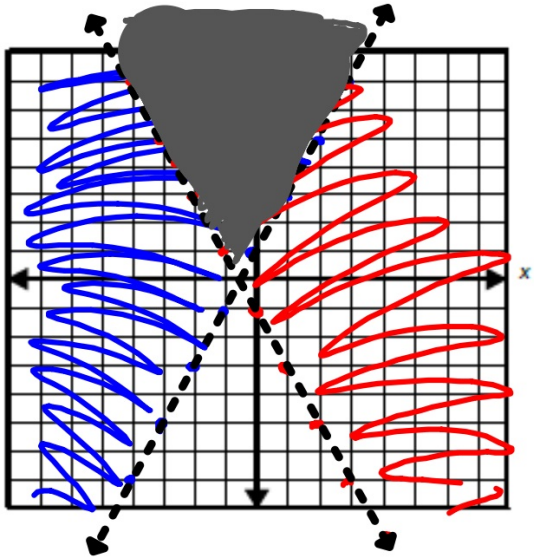
$-6x \quad -6x$

$\frac{-2y}{-2} < \frac{-6x+2}{-2}$

$y > 3x-1$

Graph the following systems of inequalities: (Be sure to shade your final region very dark!!)

7) $\begin{cases} -2y < 4x + 2 \\ y > 2x + 1 \end{cases}$

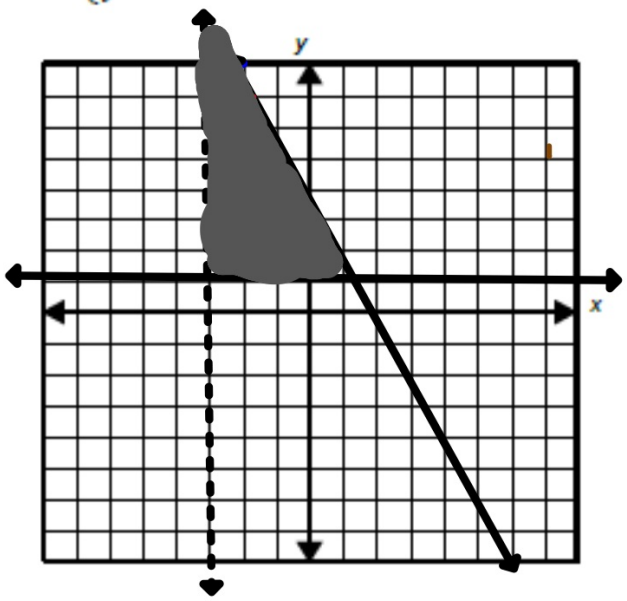


$\frac{-2y}{-2} < \frac{4x+2}{-2}$

$y > -2x - 1$

Graph the following systems of inequalities: (Be sure to shade your final region very dark!!)

8) $\begin{cases} y \le -2x + 4 \\ x > -3 \\ y \ge 1 \end{cases}$



Cumulative Questions:

9) Find the equation of the line through the points (-4,7) and (-5,2).

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{2-7}{-5-(-4)} = \frac{-5}{-1} = 5$$

$$y - y_1 = m(x - x_1)$$

$$y - 2 = 5(x - (-5))$$

$$y - 2 = 5x + 25$$

$$+2 \qquad +2$$

$$y = 5x + 27$$

Perform the following operations given $f(x) = x^2 + 4$ and $g(x) = 2x - 6$.

10) $f(x) - g(x) =$

$(x^2+4)-(2x-6)$

$x^2+4-2x+6$

$x^2-2x+10$

11) $(f \bullet g)(x) =$

$(x^2+4)(2x-6)$

$2x^3-6x^2+8x-24$

Perform the following operations given $f(x) = x^2 + 4$ and $g(x) = 2x - 6$.

12) $f(g(x)) =$

$f(2x-6)$

$(2x-6)^2 + 4$

$(2x-6)(2x-6) + 4$

$4x^2 - 12x - 12x + 36 + 4$

$4x^2 - 24x + 40$

13) Find the inverse of g(x).

$g(x) = 2x - 6$

$y = 2x - 6$

$x = 2y - 6$

$\frac{x+6}{2} = \frac{2y}{2}$

$\frac{x+6}{2} = y$

$g^{-1}(x) = \frac{x+6}{2}$

Solve the following linear programming problem (Use your graph provided, and make sure your answer is a **complete sentence**.)

14) A biologist needs at least 50 rodents for an experiment. She cannot use more than 20 mice or more than 35 rats. Each mouse costs $5.00 and each rat costs $3.00. How many of each rodent should she use in order to minimize the cost?

$C = 5x + 3y$

$C = 5(20) + 3(30)$

$C = 5(20) + 3(35)$

$C = 5(15) + 3(35)$

① \$190

② \$205

③ \$180

Constraints: ($x = \#$ of mice; $y = \#$ of rats)

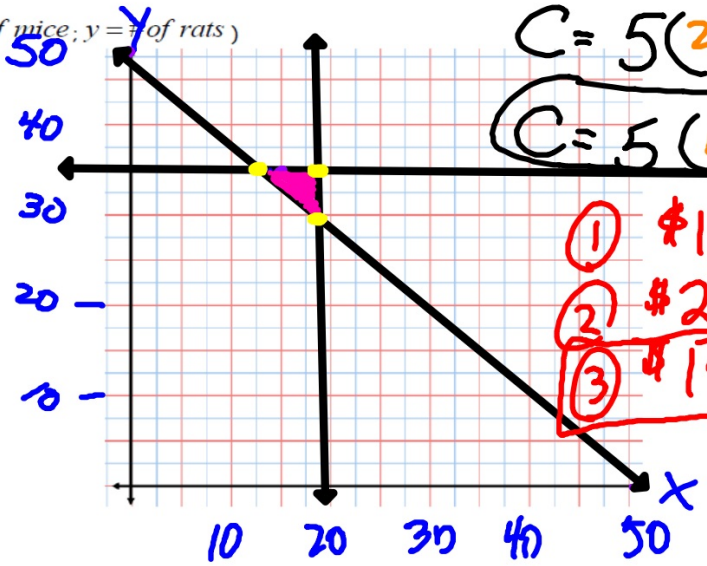
- $x + y \geq 50$
- $x \leq 20$
- $y \leq 35$

$y \geq -x + 50$

(20, 30)

(20, 35)

(15, 35)



Answer: The biologist should use 15 mice and 35 rats.